



# STEM Volunteer Training: Engaging Activities

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techbridge  
Inspire a girl to change the world



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# Training Agenda

Welcome and Introduction

Puff Mobile Activity

Key elements of a STEM lesson

Preparation & Safety

FAQs by STEM Volunteers/Mentors

Sharing successful STEM activities

Sample lessons & tools highlighted on Dept. of Energy Education Website

Additional resources

Questions & Answers

Find this training and future on our website at:

<http://www.energy.gov/diversity/services/stem-education>



**You are on mute!**

Use your webinar bar to fill out poll, send a chat or send in a question.  
Please tell us via chat if you cannot see or hear.





# Welcome and Introduction

- **Vision:** To engage diverse students in conversations around STEM and introduce them to STEM professionals.
- **Strategy:** To help achieve the goal of involving Federal STEM Volunteers in 1,000,000 hours of volunteer STEM service.
- **Need:** To facilitate STEM Volunteer training and resources for professionals that want to contribute to a volunteer or mentoring effort
- **Result:** Establish Quarterly STEM Volunteer Virtual Training Series





# Puff Mobile Supplies & Instructions:

## Materials:

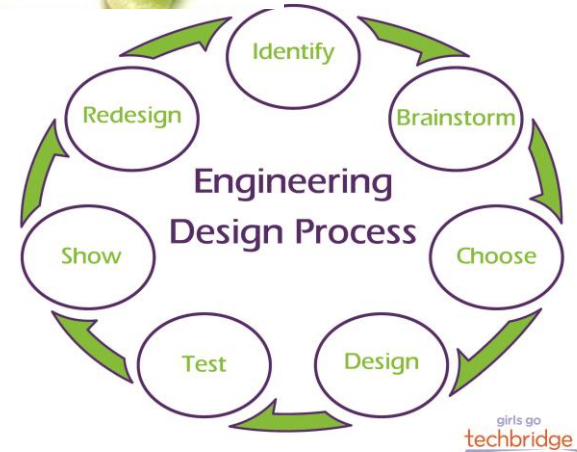
- 3 straws
- 4 lifesavers
- 1 piece of paper
- 2 paper clips
- 50 centimeters of tape

## Instructions:

- Make a car out of the materials
- Blow on the car to make it move!



\*Adapted from PBS Zoom <http://pbskids.org/zoom/activities/index.html>





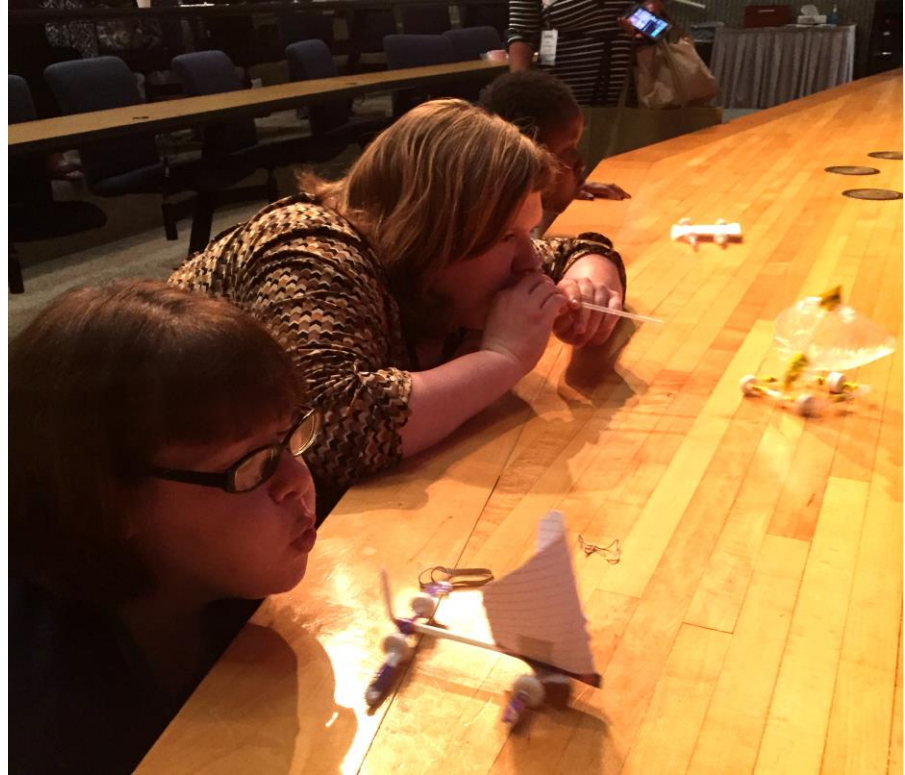
# Puff Mobile YouTube Video

<https://www.youtube.com/watch?v=O2L2JAd4ucA>





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# Fleshing out Your Lesson Plan

**Consider the Science Behind the Activity, and Key Vocabulary.**

**Incorporate these into your learning targets, and try to gauge how many kids “get” it.**

## **For Puff Mobile:**

- Wind, a renewable and clean source of energy, is the force
- Wheels make work easier
- Kinetic energy is the energy of the object in motion
- Heavier objects and faster objects have more kinetic energy





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# Safety First!

## Activity Components –

- Are there small parts, flammables, sharp edges that are potentially dangerous?
- Consider the age range
- Ask about food or chemical allergies
- Identify any protective gear (goggles, gloves, etc.) or quick training needed.

## Physical Space –

- Can all attendees see and experience the activity safely?
- You may need to rearrange furniture, split participants into small groups, etc.

## Emergency Plan –

- Do you have a plan in case of a medical or other emergency?
- Identify in advance the location of fire extinguishers, exits, etc.
- Create a simple emergency plan as needed.





# Equity and Inclusion

## Physical Ability –

Is the activity accessible – and equally experienced – by participants of different physical abilities?

- Anticipate wheelchairs, different body sizes, visual limitations and more as you prepare and facilitate your activity.

## Learning Styles –

### Can diverse learners successfully experience the activity?

- Visual, auditory, hands-on and/or kinesthetic components can help engage diverse groups.

## Demographics –

## Demographics

Is your presentation inclusive and respectful of diverse participants?

- Using gender-neutral pronouns and visuals with multiple skin tones are some ways to ensure participants feel included and represented.

## Helping Out -

## Does a participant need help?

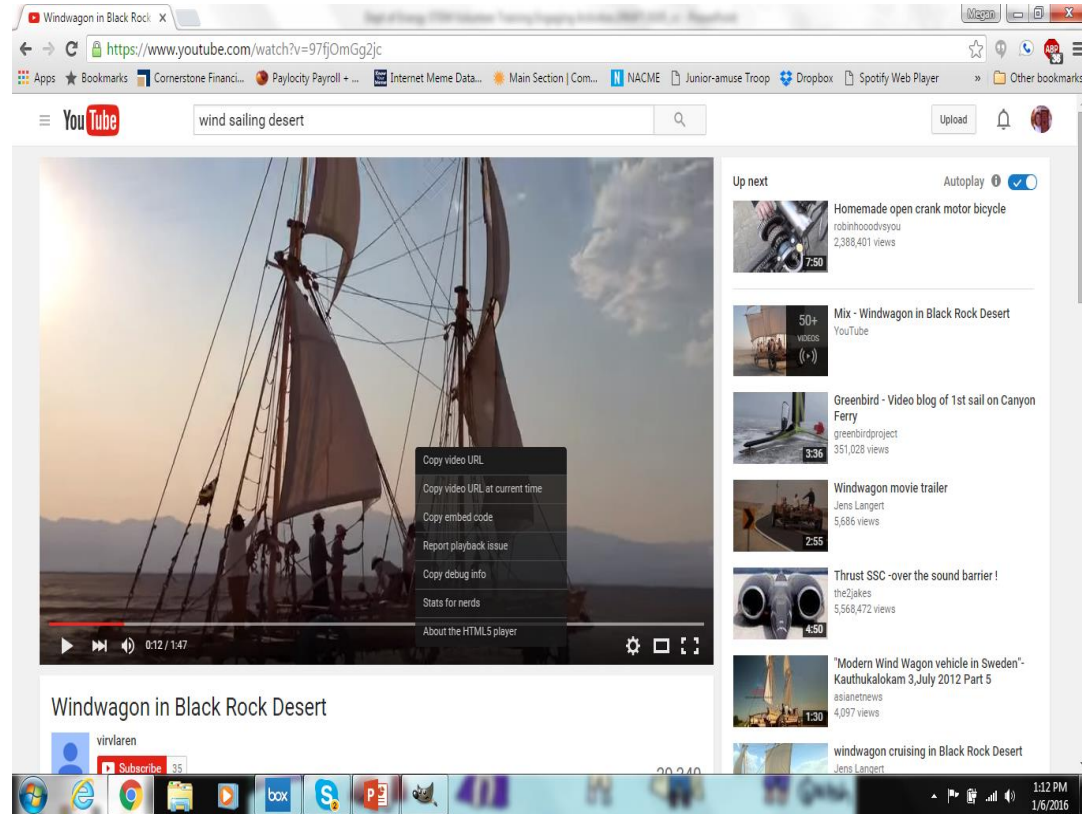
- Asking questions first and/or addressing the whole group can be more effective than assuming.





# FAQs by STEM Volunteer Mentors

- What if the activity is too easy?
- What if the activity is too hard?
- What if I see they are tuned out?
- Logistics (# in audience, room set-up, A/V & internet needs, time, behaviors, allergies)





# Sharing Successful STEM Stories

Please share successful activities that you facilitated with your students in the chat box, including the scientific concept.

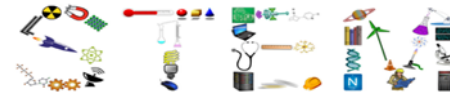
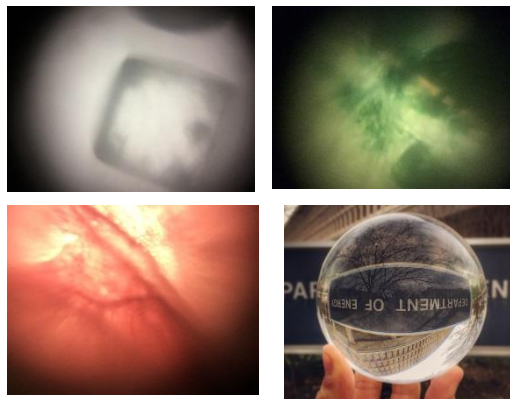




# Smartphone Microscope

- Integrated STEM learning opportunity
- Approachable Technology
- Sustained Engagement
- Involvement of Agency Employees to act for STEM Outreach
- Cost-Effective

What Will You Discover Through  
Your DOE Lens?





# Build a Pizza Box Solar Oven

- Scientific concept: The idea that the sun's heat is energy that we can use to bake food. This simple solar oven project will get hot enough to warm up cookies or other treats, but not hot enough that it will be unsafe in any classroom.
- Objective: Build a solar oven that will warm a delicious treat!
- Activity: Groups of students will have a class period to build a solar oven using materials provided.
- Materials needed include: one pizza box for each student/group, tape, scissors, black construction paper, clear plastic wrap, aluminum foil, a piece of notebook paper, a pencil or pen, a ruler or a wooden dowel or a stick.
- Experiment: Give your solar oven a try on a sunny day and pick a treat to warm up. The activity should take 30 minutes.
- For detailed instructions please visit the link below on the DOE education website:

<http://www.energy.gov/sites/prod/files/2015/02/f20/PizzaBoxSolarOven.pdf>





# Build an Energy House

- Scientific concept: Students learn about energy conservation and efficiency by using various materials to insulate a cardboard house. Specifically, they learn about conductors vs insulators.
- Objective: Build a house that will keep the coolest measured by the melting of ice cubes!
- Activity: Groups of students will have 45 minutes to build a house using different insulating materials.
- Materials can include: identical cardboard boxes, sheets of heavy transparency film, poster boards, resealable quart-sized plastics bags, and rolls of masking tape. (most material can be bought at an office supply or hardware store)
- Experiment: Once built put ice cubes in our house and determine who keeps coolest after 10 minutes





<http://www.energy.gov/eere/education/teach-and-learn>

Showing 1 - 10 of 69 results.





# Additional Education Resources

- Department of Energy – <http://www.energy.gov/education>
- Fetch – <http://www.pbs.org/parents/fetch/activities/act/index.html>
- Engineering is Elementary – <http://www.eie.org>
- eGFI – <http://teachers.egfi-k12.org/category/activities/>
- Design Squad – <http://pbskids.org/designsquad>
- PBS SciGirls – <http://www.pbslearningmedia.org/search/?q=scigirls>
- Exploratorium – <http://www.exploratorium.edu/explore/activities>
- Lawrence Hall of Science AfterSchool KidzScience (3<sup>rd</sup>-5<sup>th</sup>) – [http://www.lawrencehallofscience.org/programs\\_for\\_schools/programs/afterschool\\_kidzscience](http://www.lawrencehallofscience.org/programs_for_schools/programs/afterschool_kidzscience)
- Univ. of Washington DO-IT: <http://www.washington.edu/doit/making-science-labs-accessible-students-disabilities>
- AAAS Communicating Science: Tools for Scientists and Engineers: <http://www.aaas.org/pes/communicatingscience>
- Teachengineering: <https://www.teachengineering.org/>





STEM Mentoring Cafés are an effort to engage middle school students and their educators with STEM professionals through speed mentoring sessions with an opportunity for ongoing mentoring from federal employees.

<https://ngcpsurvey.typeform.com/to/CkUNRN>

<https://ngcpsurvey.typeform.com/to/ab85ip>

Email [stemed@energy.gov](mailto:stemed@energy.gov) with questions.









# Next Training

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April 14, 2016 at 3 pm ET

Types of Volunteering and Where to Find Opportunities

Find this training and presentation on our website at:

<http://www.energy.gov/diversity/services/stem-education>

